205 Westwood Ave, Long Branch, NJ 07740
Phone: 866-94 BOARDS (26273) / (732)-222-1511
Fax: (732)-222-7088 | E-mail: sales@touchboards.com

16X16 DVI Matrix Switch

User's Guide

Model

SW-DVI-16X16

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Section 1: Getting Started

1.1 Important Safeguards

Please read all of these instructions carefully before you use the device. Save this manual for future reference.

What the warranty does not cover

- Any product, on which the serial number has been defaced, modified or removed.
- Damage, deterioration or malfunction resulting from:
    - Accident, misuse, neglect, fire, water, lightning, or other acts of nature, unauthorized product modification, or failure to follow instructions supplied with the product.
    - Repair or attempted repair by anyone not authorized by us.
    - Any damage of the product due to shipment.
    - Removal or installation of the product.
    - Causes external to the product, such as electric power fluctuation or failure.
    - Use of supplies or parts not meeting our specifications.
    - Normal wear and tear.
    - Any other causes which does not relate to a product defect.
- Removal, installation, and set-up service charges.

1.2 Safety Instructions

- Do not dismantle the housing or modify the module.
- Dismantling the housing or modifying the module may result in electrical shock or burn.
- Refer all servicing to qualified service personnel.
- Do not attempt to service this product yourself as opening or removing housing may expose you to dangerous voltage or other hazards
- Keep the module away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Have the module checked by a qualified service engineer before using it again.

1.3 Regulatory Notices Federal Communications Commission (FCC)

This equipment has been tested and found to comply with Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

1.4 Introduction

Avenview SW-DVI-16X16 Matrix Switch is specially designed for switching 16 DVI input signals to 16 DVI outputs. It is ideal for applications that need DVI operation, such as big screen TV, TV education, TV and Telephone conference, multimedia meeting room etc.

- Supports 16 DVI-D input channel and 16 DVI-D output channels
- The EDID of the monitor can be preset
- EDID information is saved in the memory for sudden power failure
- Input signal monitor and indication
- Output load monitor and indication
- Supports both RS232 and TCP/IP control
- Web based interface for managing the device
- LED status to indicate the source and output displayed
- Supports up to 1600x1200 resolution
- Embedded circuit in device to generate signals for testing and debugging systems

1.5 Package Contents

Before you start the installation of the converter, please check the package contents.

- SW-DVI-16X16 x 1
- Power Supply x 1
- User's Manual x 1

1.6 Before Installation

- Put the product in an even and stable location. If the product falls down or drops, it may cause an injury or malfunction.
- Don't place the product in too high temperature (over 50°C), too low temperature (under 0°C) or high humidity.
- Use the DC power adapter with correct specifications. If inappropriate power supply is used then it may cause a fire.
- Do not twist or pull by force ends of the optical cable. It can cause malfunction.

Section 2: Installation

Follow these instructions for installation of SW-DVI-16X16:

1. Mount or fix the SW-DVI-16X15 safely
2. Connect the SW-DVI-16X16 to included external power supply (50Hz 200V) through the power cable
3. If controlling the SW-DVI-16X16 through RS232 port then connect the included RS232 serial cable
4. Connect RJ45 cable to SW-DVI-16X16

This equipment should be used in a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

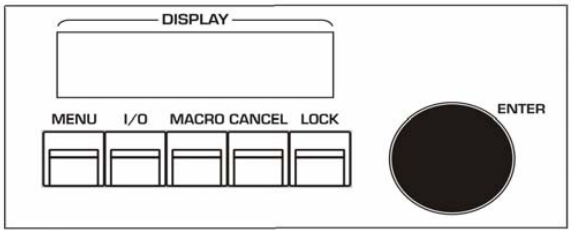
2.1 I/O Connections

Connect the DVI output of the source DVI signal to IN1 ~ IN16 of the SW-DVI-16X16 Matrix Switch. Connect the DVI cable to output connector of the SW-DVI-16-16.

For safety consideration, please cut off the power supply before replacing signal cable.

2.2 Device Operation

2.1.1 Front Panel

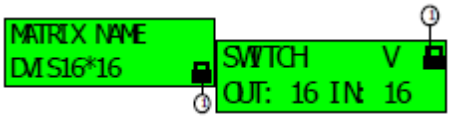


2.1.2 Device Power On

SW-DVI-16X16 has a self check with a bell warning when the unit powers on. No command will respond during 10 seconds of initial power on.

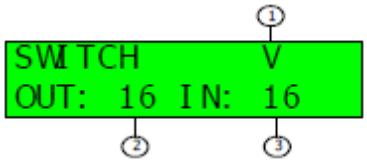
2.1.3 Lock or Unlock the Panel

If the panel is locked, press the LOCK button will unlock the panel or if panel is locked then press the LOCK button to unlock it. The LED display will show lock or unlock status as shown in the figure below.



2.1.4 Switch Input Channel to Output Channel

If the panel is locked, the device will have a bell warning when I/O button is pressed. Or if the panel is unlocked, the LED displays the I/O menu as shown in the figure below.



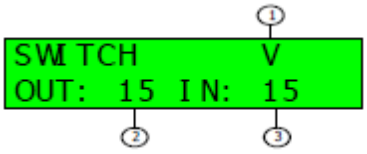
①：The present switch operation is only to Video

②：Output channel number

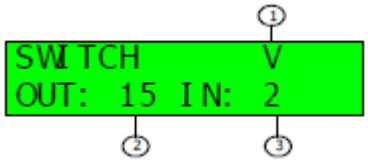
③：Input channel number

Example 1: To Switch Input Channel 2 to Output Channel 15

1. Unlock the Panel as described above
2. **Select Operation Format:** Troll the ENTER button to move the cursor to 1 and press the I/O or ENTER button. The format symbol will blink. Troll the ENTER button to select the format symbol from “A”, “V”, and “A/V” and press the I/O or ENTER button to set the format symbol.
   Format Symbol A = Operation is Audio Only
   Format Symbol V = Operation is Video Only
   Format Symbol A/V = Operation is Audio / Video (This device only has “V” operation format)
3. **Select Output Channel:** Troll the ENTER button to move the cursor to ②, and press the I/O or ENTER button, then the output channel symbol “16” blinks. Troll the ENTER button to set the output channel to be “15”, and press the I/O or ENTER button to confirmed the output channel, then the LED displays as shown in the figure below



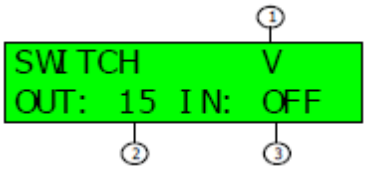
4. **Select Input Channel:** Troll the ENTER button to move the cursor to ③and select the input channel in the same way as selecting the output channel. Press the I/O or ENTER button and then finish to switch Input channel 2 to output channel 15,and the LED displays as shown in the figure below.



LOCK the panel when finished setting the channel.

Example 2: Turn OFF Output Channel 15

1. Unlock the panel if the panel locked
2. Select operation format
3. Select output channel
4. Set input channel to be “OFF” in the same way as selecting input channel. Then finish to off output channel 15,and the LED displays as shown in figure below.

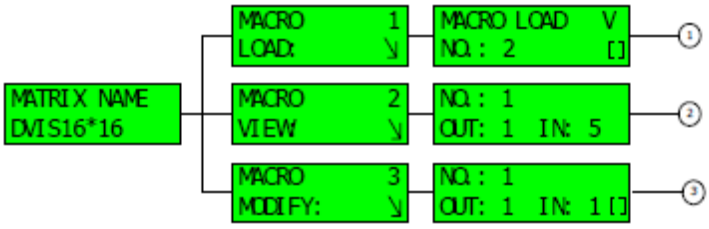


LOCK the panel when finished setting the channel.

2.1.5 Macro Operation

If the panel locked, the device will have a bell warning when press the MACRO button, or if the panel unlocked, the LED will display the MACRO menu as the following figure 7 when press the MACRO button.

> *The panel can save only ten macros, and the macros content can only be set through the panel, namely through RS232 communication you can not change the content of the ten macros.*

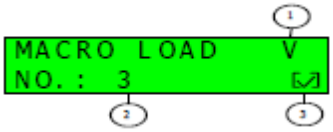


Macro menu has 3 sub-menus:

1. Load Macro: Load the macro content to the device
2. View Macro: View the macro content
3. Modify Macro: Set the macro content

Example: Load Macro 3

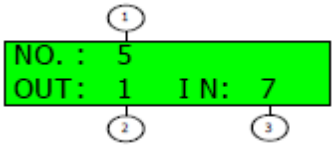
1. Unlock the panel if it is locked
2. Move cursor to ① to select operation format
3. Move cursor to ② to select Macro number.
4. Move cursor to ③ to load Macro 3 content to the device, the LED display is as the following figure 9.



LOCK the panel if finished setting the Macro

Example: Load Macro 3

1. Unlock the panel if it is locked
2. **Select Macro Number**: Move cursor to ① to select the macro number to be viewed through the MACRO and Enter button.



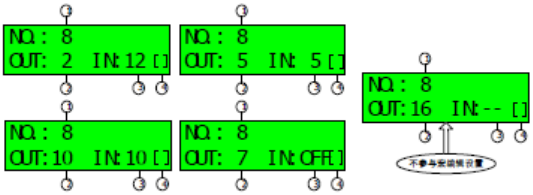
3. View macro content: Move cursor to ②,troll ENTER button to view each output channel, and ③ displays the corresponding input channel, if ③ displays "OFF" means output channel is off, if ③ displays "--" means output channel is ignored.

LOCK the panel if finished setting the Macro

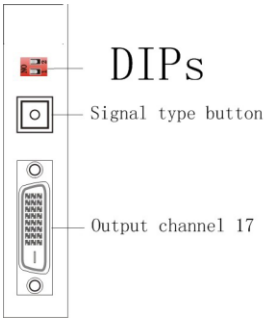
Example: Modify Macro 8

If you want to set macro 8 content to be output channel 2 to input channel 12,output channel 5 to input channel 5,output channel 10 to input channel 10, output channel 7 is off, and other output channels are ignored.

1. Unlock the panel if it is locked
2. Move cursor to ① to select the macro number 8 through MACRO and ENTER button.
3. Move cursor to ② to select output channel 2, Move cursor to ③ to select input channel 12. The same way to set the output channels 5,7,10 as the following figure 12. And other output channels set to be as output channel 16.
4. LOCK the panel if finished setting the Macro



2.1.6 Test Signal Board



1. The output resolution is up to the two bits of DIPs on the test signal board.

DIPS	BIT 1	BIT2
OFF	OFF	Output Resolution: 1600x1200x60Hz
OFF	ON	Output Resolution: 1280x1024x60Hz
ON	OFF	Output Resolution: 1280x960x60Hz
ON	ON	Output Resolution: 1152x864x75Hz

2. Signal type Button: There are four kinds of signal saved in the test signal board, namely color vertical bar, white-black vertical bar, chessboard-grid and white-black vertical line. Press the button you can choose the signal you need.
3. Output channel 17 has the same function as the former 16 output channels.

Example: Set Output Channel 17 to be 1600x1200 and Color Vertical Bar

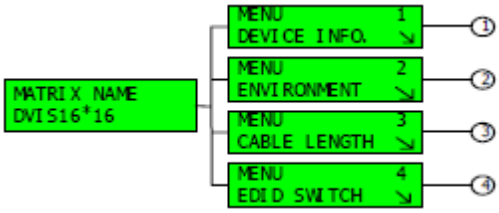
1. Unlock the panel if the panel locked.
2. Press the I/O button and the LED displays the I/O menu. Set both the output channel and the input channel to be 17 with the I/O button and the ENTER button.
3. Press the I/O button or the ENTER button will tie output channel T1 to input channel T1.
4. Set the DIPs to be Bit 1 OFF and Bit 2 OFF.
5. Press the Signal type Button to set the signal to be color vertical bar.
6. IF no other operation on panel, press LOCK button to lock the panel.

Example: Set Output Channel 17 to be 1280x1024 and Chessboard Grid

1. Unlock the panel if the panel locked.
2. Press the I/O button and the LED displays the I/O menu. Set the output channel to be 3 and the input channel to be T1 with the I/O button and the ENTER button.
3. Press the I/O button or the ENTER button will tie output channel 3 to input channel T1.
4. Set the DIPs to be Bit 1 OFF and Bit 2 OFF (Resolution: 1280×1024×60Hz).
5. Press the Signal type Button to set the signal to be chessboard-grid.
6. IF no other operations on panel, press LOCK button to lock the panel.

2.1.7 Other Functions

If the panel locked, the device will have a bell warning when press the MENU button, or if the panel unlocked, the LED will display the MENU menu as the following figure 14 when press the MENU button.



① Check device information about input signal and output load.

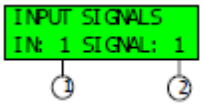
② Check device information about temperature and voltage.

③ Set cable length of input channel.

④ Copy output channel EDID to input channel.

Example: Check Device Input Channel Signal

To the following submenu, the cursor is at ①.



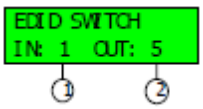
① Input channel number

② Signal symbol: if ② displays "1", the corresponding input channel has active signal, or no signal.

You can view each input channel signal symbol through trolling ENTER button

Example: Copy Output Channel 10 EDID to Input Channel 8

To the following submenu, the cursor is at ①.



1. Unlock the panel if the panel locked (The LED displays as above figure).
2. Select input channel number: Select input channel 8 through MENU and ENTER button.
3. Select output channel number: Move cursor to ②, select output channel 10 and press the MENU or ENTER button then finish to Copy Output Channel 10 EDID to Input Channel 8.
4. IF no other operation on panel, press LOCK button to lock the panel.

Section 3: System Management

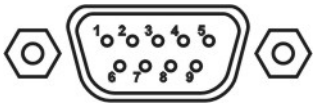
3.1 Description

SW-DVI-16X16 can be managed by two different ways: RS232 or through Network (IP)

3.1.1 Control by RS232

1. **Male 9-Pin D Connector:**

Pin 2: RXD (Receive)	Pin 3: TXD (Send)
Pin 5: GND (Ground)	Other Pins: N/A



2. **Baud Rate:** 9600 bit/s, 8 bit, one stop bit, no parity bit
3. **Protocol Format:** SW-DVI-16X16 supports both the LIGUO hex protocol format (the A communication format) and the B communication format.
4. **Command:**

Format of sending: 0xEB，Address，Command，Length of data，Data1，．．．，Data n，Redundancy.

0xEB	Frame starting point, binary system showing：11101011.
Address：	Code of the device, set before stepping off the product line, unchangeable, all the devices of the same series have the same address.
Command：	Show the commands by hexadecimal data.
Data length：	The number of the bytes received or sent, only including those of from Data 1 to Data 4
Redundancy：	Check whether it is right in the process of sending or receiving. It is counted by the sending part when sending data and by the device when send back the data. Method: Redundancy= Address + Command + Data length + Data 1+…+Data n If Redundancy=EBH, then Redundancy=14H; If Redundancy has carry, ignore the carry and get Low 8 bits. *For example, EBH, 90H, 01H, 01H, F3H, 90H* Redundancy = 90H + 01H + 01H + F3H = 185H Ignore the carry, e.g. Redundancy=85H.

3.1.2 Control by Network

1. **Protocol:** SW-DVI-16X16 supports the network control based on TCP/IP protocol, RJ-45 port offers physical connect between the equipment and net. Actually, the equipment has a default IP address that is 192.168.0.104 and the MAC address is labeled at the back of equipment. There are two indicator lights reflect the net connecting state. The closer light shows the power is on or not. The steady shining indicator light shows power on. The blinking light shows the net is working, the going out light means the power does not connect. Another indicator light shining means connection of the net port is common; otherwise the light going out is abnormal.
2. **Set a new parameter of the IP address according to the existing one:**
    a. Make sure the net ready to work and the device connected to net;

b. According to the DOS direction, input the command: telnet 192.168.0.104 9999 (192.168.0.104 9999 is the current device's IP address) then the information shows as follows. The serial code of produce: XXXXXXX

MAC address: XX：XX：XX：XX：XX：XX

Vision number of Software: XX.X (XXXXXX)

Press "Enter" to come into the mode of setting parameter.

c. Press "Enter" button on keyboard to show the info as below

Change setting: 0 server setting;

1 serial interface setting;

6 safety setting;

7 resume default setting;

8 quit without save;

9 quit and save

Choose step: ??

d. Press 0 and then "Enter". Information as follows: IP address: <192>

e. Input IP address and then "Enter". Information as follows:

IP address of setting net gateway: <N>

f. Press "Enter" and then showing as follows:

The masking of subnet: digit of the inputted masking<0=default>

g. Press "enter" and then showing as follows:

Change the passport of telnet (N)

h. Press "enter" then showing as follows:

Change set:

0 server setting;

1 serial interface setting;

6 safety setting;

7 resume default setting;

8 quit without save;

9 quit and save

Choose step: ?

i. Input 9 and press "Enter" to save and quit the operation.

j. Input the command: ping **192.168.0.104,** if the above operation is successful, information is showed as follows:

k. Pinging 192.168.0.104 with 32 bytes of data:

Reply from 192.168.0.104: bytes=32 time<10ms TTL=64

Reply from 192.168.0.104: bytes=32 time<10ms TTL=64

Reply from 192.168.0.104: bytes=32 time<10ms TTL=64

Reply from 192.168.0.104: bytes=32 time<10ms TTL=64

Ping statistics for 192.168.0.104:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average = 0ms

3. **Set a new parameter of IP address according to device's MAC address:**

a. Record the Mac address at rear keyboard.

b. According to DOS direction, Input the command: arp -s **192.168.0.123** XX-XX-XX-XX-XX-XX (**192.168.0.123** is temporary address; XX-XX-XX-XX-XX-XX is the MAC address of equipment) and press, "enter".
c. Input "telnet **192.168.0.123 1**"
d. Input "telnet **192.168.0.123** 9999". After that set up and save a new IP address based on your existing IP schema

Since the IP address assigned is temporary, if unit is restarted without saving the IP address, it will be lost. To save IP address input command "telnet 192.168.0.123 9999" to save the new IP address.

3.1.3 Control the Device by NET Control Command

If you need to control the SW-DVI-16X16 Matrix Switch via Internet, then the unit must connect to Internet, and SW-DVI-16X16 must be host computer, controlling equipment must be assistant computer. Before using command, controlling equipment need send connection request to SW-DVI-16X16 via TCP/IP protocol, and then build a net. After that send the commands to host computer, data are all binary system, communication command and protocol formats same as RS232 controlling format, the supporting commands are same as RS232's commands.

3.1.4 Control the Device by WEB Interface

1. Introduction of WEB control mode

   SW-DVI-16X16 has a WEB server inside, this server supplies supervision function about working state data, such as device's inside temperature and power voltage, and control device's input and output via web. After set up a correct net control parameter (IP address), the device can be available through HTTP.

2. Control process
   For example: control process is based on TCP/IP, OS is "Widows" professional, IE 6.0, JRE1.4.6 (JAVA Run Time Environment) inside.
3. Make sure the device connects to Internet via "ping" command.
4. Start up browser; input IP address, like http://192.168.0.104 and then the web will display that is inside the host computer.

3.1.5 Communication Format A

1. Format of Character All data are showed by hexadecimal data.
2. **Explanation of character**
   The symbol"," and "." just stands for list separator without any meanings, and wouldn't be sent in the process of sending data. The data with "under line" or "black type" are key words.
3. **Data length**
   The data must be among 0x01~0xFF excluding 0xEB, represent the quality of data 1~ data n and are accordant with the subsequent data.
4. **0x00**
   It stands for any number from 0x00 to 0xFF excluding 0xEB.

5. **Output data 1~N**
   It symbolized codes of output ports; the range is from 0x00 to the maximum number that the device supports.
6. **Input data 1~N**
   It symbolized codes of input ports; the range is from 0x00 to the maximum input number that the device supports. 00x0 means input No.1; 0x01 means input No.2. Please caution that the maximum input port number's code plus ONE symbolized closing this port. For example, the device supports eight input ports, then 0x07 symbolizes No.8 port, 0x08 symbolizes close.
7. **Pre-select input through long-distance control**
   Similar with input by keyboard
8. **Address**
   0x90
9. **Response**
   a. The equipment correctly receives and executes the command. Then execute the command and response as follows. 0xeb，Address，Command，0x01，0xfa，Redundancy.
   b. The equipment receives the address correctly but data out of the range. Then doesn't execute the command and response as follows. 0xeb，Address，Command，0x01，0xf2，Redundancy.
   c. The equipment receives correctly but is controlled through keyboard. Then doesn't execute the command and response as follows. 0xeb，Address，Command，0x01，0xf3，Redundancy.
   d. The equipment receives the address correctly but data length wrongly. Then doesn't execute the command and response as follows. 0xeb，Address，Command，0x01，0xf7，Redundancy.
   e. The equipment receives the address correctly but the command is no support. Then doesn't execute the command and response as follows. 0xeb，Address，Command，0x01，0xf1，Redundancy.
   f. The equipment receives the address wrongly. No response.

3.1.6 Commands

1. Command 0x00(two functions)

Function 1	Get the equipment address and software version
Format	0xeb, 0x00, 0x00, 0x01, 0x01
Response	0xeb, Address, 0x00, 0x02, Version, 0xfa, Redundancy

For example：Get the equipment address and software version

Commands: 0xeb, 0x00, 0x00, 0x01, 0x01

Response: 0xeb, 0x90, 0x00, 0x02, 0x10, 0xfa, Redundancy

Function 2	Get the information of the equipment's type
Format	0xeb, 0x90, 0x00, 0x01, 0x49
Response	0xeb, 0x90, 0x00, 0x03, Input Signal Type，Maximal Input Channel Quantity，Maximal Output Channel Quantity
Note: The value of Input Signal Type is 0x80,it means DVI type	

For example：Get the information of equipment's type
Commands: 0xeb, 0x90, 0x00, 0x01, 0x49
Response: 0xeb, 0x90, 0x00, 0x03, 0x80, 0x10, 0x10, Redundancy

2. Command 0x01

Function	Tie the input channel to output channel
Format	0xeb, 0x90, 0x01, N, Input Number of output channel 1…Input Number of output channel N.
Response	0xeb, 0x90, 0x01, 0x01, 0xfa, Redundancy
Note: The range of N is from 0x01 to 0x11. Note: The range of Input Number is from 0x00 to 0x11. 0 means INPUT 1, 1 means INPUT 2, 0x11 means closing output.	

For example 10：Tie the input channel 8 to the output channel 1, the input channel 17 to the output channel 2 and close the output channel 3.
Commands: 0xeb, 0x90, 0x01, 0x03, 0x07, 0x10, 0x11
Response: 0xeb, 0x90, 0x01, 0x01, 0xfa, Redundancy

3. Command 0x02

Function	Tie the appointed output channels to the appointed input channels.
Format	0xeb， 0x90, 0x02, N, Output Number 1,Input Number 1,…,Output Number N, Input Number N
Response	0xeb, 0x90, 0x02, 0x01, 0xfa, Redundancy
Note: The range of N is the even from 0x02 t0 0x22. Note: The range of Output Number is from 0x00 to 0x10. 0x10 stands for the test output.Note 3: The range of Input Number is from 0x00 to 0x11. 0x11 is used to close the output. 0x10 is used to tie the output to the internal test signal.	

For example 1： Tie the input channel from 1 to 8 to output channel from 1 to 8 respectively.
Commands: 0xeb, 0x90, 0x02, 0x10, 0x00, 0x00, 0x01, 0x01, 0x02, 0x02, 0x03, 0x03, 0x04, 0x04, 0x05, 0x05, 0x06, 0x06, 0x07, 0x07
Response: 0xeb, 0x90, 0x02, 0x01, 0xfa, Redundancy
For example 2： Tie the input channel 2 to the output channel 8
Commands: 0xeb, 0x90, 0x02, 0x02, 0x07, 0x01
Response: 0xeb, 0x90, 0x02, 0x01, 0xfa, Redundancy

4. Command 0x03(three functions)

Function 1	Get the marks of signals at input channels
Format	0xeb, 0x90, 0x03, 0x01, 0x00
Response	0xeb, 0x90, 0x03, 0x04, Mark 1, Mark 2, Mark 3, Mark 4,Redundancy

Note: Mark 1 expresses in binary as this mode " 0，0，0，0，bit3，bit2，bit1，bit0 "，bit0 to bit3 means the marks of signals at input channel 1 to 4 respectively，if the bit value is 1，then the corresponding input channel has signal, or if the bit value is 0, the corresponding input channel has not signal. So to the Mark 2，its value expresses the signals of the input channel 5 to 8. So to the Mark 3，its value expresses the signals of the input channel 9 to 12. So to the Mark 4，its value expresses the signals of the input channel 13 to 16.

For example 1： Get the marks of signals at input channels

Commands: 0xeb, 0x90, 0x03, 0x01, 0x00

Response: 0xeb, 0x90, 0x03, 0x04, 0x08, 0x04, 0x00, 0x00, Redundancy

Explanation: At this time, the Mark 1 is 08H and the Mark 2 is 04, 0x08 expressed in binary is"0，0，0，0，1，0，0，0"， so the input channel 4 has signal and the input channel 1 to 3 have not signals; 0x04 expressed in binary is"0，0，0，0，0，1，0，0"，so the input channel 7 has signal and the input channel 5,6 and 8 have not signal, other input channels have no signal.

Function 2	Get the Preset Input Channel
Format	0xeb, 0x90, 0x03, 0x01, 0x01
Response	0xeb, 0x90, 0x03, 0x01, Preset Input Channel， Redundancy
Note: The range of the Preset Input Channel is as same as the Maximal Input Channel	

For example： Get the Preset Input Channel

Commands: 0xeb, 0x90, 0x03, 0x01, 0x01

Response: 0xeb, 0x90, 0x03, 0x01, 0x04, Redundancy

Explanation: The Preset Input Channel is input channel 5.

Function 3	Get the mark of the load at the output channels
Format	0xeb, 0x90, 0x03, 0x01, 0x04
Response	0xeb, 0x90, 0x03, 0x05, Mark 1, Mark 2, Mark 3, Mark 4, Mark 5,Redundancy
Note: Mark 1 expresses in binary as this mode " 0，0，0，0，bit3，bit2，bit1，bit0 "，bit0 to bit3 means the marks of Load at output channel 1 to 4 respectively，if the bit value is 1，then the corresponding output channel has load, or if the bit value is 0, the corresponding output channel has not load. So to the Mark 2，its value expresses the signals of the output channel 5 to 8. So to the Mark 3，its value expresses the signals of the output channel 9 to 12. So to the Mark 4，its value expresses the signals of the output channel 13 to 16. So to the Mark 5，its value expresses the signal of the output channel 17.	

For example： Get the mark of the load at the output channel

Commands: 0xeb, 0x90, 0x03, 0x01, 0x04

Response: 0xeb, 0x90, 0x03, 0x05, 0x05, 0x01, 0x00, 0x00, 0x00, 0x9b

Explanation: At this time, the Mark 1 is 0x05 and the Mark 2 is 0x01, 0x05 expressed in binary is"0，0，0，0，0，1，0，1"， so the output channels 1 and 3 have loads and the output channels 2 and 4 have not loads; Mark 2 0x01 expressed in binary is"0，0，0，0，0，0，0，1"，so the output channel 5 has load. Other output channels have no loads.

5. Command 0x04(three functions)

Function 1	Get the tied status of an appointed input channel
Format	0xeb, 0x90, 0x04, 0x02, 0x01, Input Number

Response	0xeb, 0x90, 0x04, N, Output Number 1, …, Output Number N, Redundancy
Note: The range of Input Number is as same as the note 2 of command 0x01 Note: The range of Output Number is as same as the note 2 of command 0x02	

For example: Get the tied status of an appointed input channel
Commands: 0xeb, 0x90, 0x04, 0x02, 0x01, 0x04
Response: 0xeb, 0x90, 0x04, 0x02, 0x01, 0x05, Redundancy
Explanation: The input channel 5 has been tied to output channels 2 and 6.

Function 2	Get the tied status of an appointed output channel
Format	0xeb, 0x90, 0x04, 0x02, 0x02, Output Number
Response	0xeb, 0x90, 0x04, 0x01, Input Number, Redundancy
Note: The range of Output Number is as same as the note 2 of command 0x02. Note: The range of Input Number is as same as the note 2 of command 0x01.	

For example: Get the tied status of an appointed output channel
Commands: 0xeb, 0x90, 0x04, 0x02, 0x02, 0x04
Response: 0xeb, 0x90, 0x04, 0x01, 0x07, Redundancy
Explanation: The output channel 5 has been tied to input channel 8.

Function 3	Get the tied status of all output channels
Format	0xeb, 0x90, 0x04, 0x01, any data except 0xeb
Response	0xeb, 0x90, 0x04, 0x08, Input Number of output channel1, …, Input Number of output channel 16, Redundancy
Note: The range of Input Number is as same as the Note 2 of command 0x01	

For example: Get the tied status of all output channels
Commands: 0xeb, 0x90, 0x04, 0x01, 0x01
Response: 0xeb, 0x90, 0x04, 0x11, 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09, 0x0a, 0x0b, 0x0c, 0x0d, 0x0e, 0x0f, 0x10, Redundancy
Explanation: The output channel from 1 to 17 has been tied to input channel from 1 to 17 respectively.

6. Command 0x05

Function	Set the Preset Input Channel
Format	0xeb, 0x90, 0x05, 0x01, Input Number
Response	0xeb, 0x90, 0x05, 0x01, 0xfa, Redundancy
Note: The range of Input Number is as same as the Note 2 of command 0x01	

For example: Set the Preset Input Channel
Commands: 0xeb, 0x90, 0x05, 0x01, 0x02
Response: 0xeb, 0x90, 0x05, 0x01, 0xfa, Redundancy
Explanation: The Preset Input Channel is set up to input channel 3.

7. Command 0x06

Function	Tie an appointed output channel to the Preset Input Channel.
Format	0xeb, 0x90, 0x06, 0x01, Output Number
Response	0xeb, 0x90, 0x06, 0x01, 0xfa, Redundancy

Note: The range of Output Number is as same as the Note 2 of command 0x02

For example： Tie an appointed output channel to the Preset Input Channel
Commands: 0xeb, 0x90, 0x06, 0x01, 0x04
Response: 0xeb, 0x90, 0x06, 0x01, 0xfa, Redundancy
Explanation: The output channel 5 has been tied to the Preset Input Channel.

8. Command 0x0c

Function 1	Recode Macro
Format	0xeb, 0x90, 0x0c, N, 0x00, Macro Number, Output Number 0，Input Number 0，…，Output Number N，Input Number N， Redundancy
Response	0xeb, 0x90, 0x0c, 0x01, 0xfa, 0x0f
Note: The range of N is the even from 0x02 to 0x22	

For example：Recode the Macro 1
Commands: 0xeb, 0x90, 0x0c, 0x06, 0x00, 0x00, 0x01, 0x01, 0x02, 0x02,
Response: 0xeb, 0x90, 0x0c, 0x01, 0xfa, Redundancy

Explanation: In this Macro, the Macro number is 1, the output channel 2 、3 is tied to the input channel 2、3 respectively and other output channels are ignored

Function 2	View Macro
Format	0xeb, 0x90, 0x0c, 0x02, 0x02, Macro Number
Response	0xeb, 0x90, 0x0c, N, Macro Number，Output Number 0，Input Number 0，…，Output Number M，Input Number M， Redundancy
Note: The range of Macro Number from 0x00 to 0x10 Note: The range of N is an odd from 0x01 to 0x21	

For example： View Macro Number 1
Commands: 0xeb, 0x90, 0x0c, 0x02, 0x02, 0x00
Response: 0xeb, 0x90, 0x0c, 0x05, 0x00, 0x01, 0x01, 0x02, 0x02, Redundancy
Explanation: In the Macro number 1: the output channel 2 、3 is tied to the input channel 2、3 respectively and other output channels are ignored.

Function 3	Recall Macro.
Format	0xeb, 0x90, 0x0c, 0x02, 0x01, Macro Number
Response	0xeb, 0x90, 0x0c, 0x01, 0xfa, 0x0f
Note: The range of Macro Number is from 0x00 to 0x10.	

For example： Recall Macro Number 1
Commands: 0xeb, 0x90, 0x0c, 0x02, 0x01, 0x00
Response: 0xeb, 0x90, 0x0c, 0x01, 0xfa, Redundancy

9. Command 0xfd (three functions)

Function 1	View the status of switching EDID
Format	0xeb, 0x90, 0xfd, 0x02, 0x02, 0x00
Response	0xeb, 0x90, 0xfd, 0x10, the EDID mark of the input

	channel 1,……， the EDID mark of the input channel 16, Redundancy
Note: 0x10 is the num of input channels. If the EDID mark of the input channel 1 is 0x01, it means the EDID of the output channel 2 is copied to the input channel 1, and so to the mark of other input channels. If the mark is 0x11, it means the default EDID is copied to the input.	
Function 2	Copy the EDID of Load at the appointed output channels to the appointed input channels
Format	0xeb, 0x90, 0xfd, N, 0x01, the EDID source of Input channel 1… the EDID source of Input channel N
Response	0xeb, 0x90, 0xfd, 0x01, 0xfa, Redundancy
Note: The range of N is from 0x01 to 0x10 Note: The range of the EDID source is from 0x00 to 0x0f, they stand for output channel from 1 to 16 respectively. Note: If there is no load at the appointed output channel, then the default EDID will be used	

For example: Copy the EDID of output channels from 4 to 8 to the input channels from 1 to 5

Commands: 0xeb, 0x90, 0xfd, 0x06, 0x01, 0x03, 0x04, 0x05, 0x06, 0x07

Function 3	Copy the default EDID to the appointed input channels
Format	0xeb, 0x90, 0xfd, 0x02, 0x02, Input Number
Response	0xeb, 0x90, 0xfd, 0x01, 0xfa, Redundancy

For example： Copy the default EDID to the input channel 5

Commands: 0xeb, 0x90, 0xfd, 0x02, 0x02, Redundancy

10. Command 0xfa (nine functions)

Function 1	Get the signal marks of all input channels
Format	0xeb, 0x90, 0xfa, 0x02, 0x00, 0x00
Response	0xeb, 0x90, 0xfa, 0x11, Mark 1， … , Mark 16 , Redundancy
Note: The value of Mark 1 to Mark 16 is 0x00 or 0x01; if the mark value is 0x01， then the corresponding input channel has signal, or if the mark value is 0x00, the corresponding input channel has not signal.	

For example： Get the signal marks of all input channels

Commands: 0xeb, 0x90, 0xfa, 0x02, 0x00, 0x00

Response: 0xeb, 0x90, 0xfa, 0x11, 0x00, 0x00, 0x00, 0x00, 0x01, 0x01, 0x01, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, Redundancy

Explanation: The input channels from 5 to 8 have signals, and other input channels have no signal.

Function 2	Get the load marks of all output channels
Format	0xeb, 0x90, 0xfa, 0x02, 0x00, 0x01
Response	0xeb, 0x90, 0xfa, 0x11, Mark of output channel1， …, Mark of output channel 17， Redundancy
Note: The value of marks from 1 to 17 is 0x00 or 0x01; if the mark value is 0x01， then the corresponding output channel has load, or if the mark value is 0x00, the corresponding output channel has not load.	

For example： Get the load marks of all output channels

Commands: 0xeb, 0x90, 0xfa, 0x02, 0x00, 0x01

Response: 0xeb, 0x90, 0xfa, 0x11, 0x00, 0x00, 0x00, 0x00, 0x01, 0x01, 0x01, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, Redundancy
Explanation: The output channels 5 to 8 have loads; other output channels have no loads.

Function 3	Get the Temperature Value of all sub boards
Format	0xeb, 0x90, 0xfa, 0x02, 0x00, 0x02
Response	0xeb, 0x90, 0xfa, 0x11, Temperature Value of Control Board ，Temperature Value of Input Board 1，…，Temperature Value of Input Board 8，Temperature Value of Output Board 1，…，Temperature Value of Output Board 8 ，Redundancy
Note: Actual temperature =(Temperature Value)-20 For example： If the Temperature Value is 0x38, then the actual temperature is 36℃(0x38-20=56-20=36). Note: if the Temperature Value is zero，then the corresponding sub board or the sub board temperature sensor is not exit.	

For example：Get the information of sub boards temperature
Commands: 0xeb, 0x90, 0xfa, 0x02, 0x00, 0x02
Response: 0xeb, 0x90, 0xfa, 0x11, 0x38, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, Redundancy
Explanation: The temperature of Control Board is 36℃.Other boards are not exit.

Function 4	Get the Voltage value of the control boards.
Format	0xeb, 0x90, 0xfa, 0x02, 0x00, 0x03
Response	0xeb, 0x90, 0xfa, 0x05, 0x00, Data 1(Voltage value)，…，Data 4(Voltage value)， Redundancy
Note: 0x03means this operation is to check the control board voltage. Note: Data 1 to Data 4 value stand for the temperature on different parts of the control board. The corresponding relation is as follows: Voltage NO. Normal voltage. Voltage step 1 +2.5V 6.51mV 2 +2.5V 5.86mV 3 +5.0V 13.02mV 4 +12.0V 31.25Mv The actual temperature=(Data n)× 4 × corresponding voltage step. For example If Data 0 value is 0x5F, then the actual temperature is 0x5F×4×6.51=2473.8mV，namely 2.47V. If Data 3 value is 0x61, then the actual temperature is 0x61×4×13.02=5051.8mV，namely 5.05V.	

For example: Get the Voltage value of the control boards
Commands: 0xeb, 0x90, 0xfa, 0x02, 0x00, 0x03
Response: 0xeb, 0x90, 0xfa, 0x05, 0x00, 0x5f, 0x6b, 0x61, 0x6c, Redundancy
Explanation: The corresponding voltage is 2.47V、2.5V、5.0V、13.5V

Function 5	Get the working status
Format	0xeb, 0x90, 0xfa, 0x02, 0x00, 0x04
Response	0xeb, 0x90, 0xfa, 0x03, Mark initialization ，Baud Value of serial port，Type of equipment， Redundancy
Note: The range of mark initialization is from 0x00 to 0x02, If the mark value is 0x00，then the	

equipment has not been initialized; If the mark value is 0x01, then the equipment has been initialized, but the module is still without power: If the mark value is 0x02, then the equipment already power on and work well. Note: The Baud Value of serial port is fixed 0x00, it stands for 9600bit/s， 8bit， 1 stop bit, no parity. Note: The type of equipment value is 0x80, and it stands for DVI type.

For example: Get the working status
Commands: 0xeb, 0x90, 0xfa, 0x02, 0x00, 0x04
Response: 0xeb, 0x90, 0xfa, 0x03, 0x02, 0x00, 0x80, Redundancy
Explanation: The equipment is in normal working state， the serial communication baud rate is 9600 and the device signal type is DVI .

Function 6	Reset the equipment.
Format	0xeb, 0x90, 0xfa, 0x02, 0xaa, 0x06
Response	0xeb, 0x90, 0xfa, 0x01, 0xfa, 0x85

For example: Reset the equipment.
Commands: 0xeb, 0x90, 0xfa, 0x02, 0xaa, 0x06
Response: 0xeb, 0x90, 0xfa, 0x01, 0xfa, 0x85

Function 7	Set the length of inputs cable.
Format	xeb, 0x90, 0xfa, 0x04, 0x00, 0x0b, the input channel, the Value of the length
Response	0xeb, 0x90, 0xfa, 0x01, 0xfa, 0x85
Note: The Value of the length is from 0x00 to 0x0f. If there is no input board, it backs F2.	

Function 8	View the length of inputs cable
Format	0xeb, 0x90, 0xfa, 0x02, 0x00, 0x0c
Response	0xeb, 0x90, 0xfa, 0x12, 0x00, 0x0c, the length of the input channel 1 cable,……, the length of the input channel 16 cable, Redundancy

Function 9	Switch the communication format between A and B
Format	0xeb, 0x90, 0xfa, 0x04, Port num, the num of the format, 0xaa, 0x55
Response	NO
Note: The RS-232 Port is 0x03, and the Network Port is 0x04. The Format Num: 0x00 A, 0x01 B	

3.1.7 Communication Format B

1. Both sent and received data are ASCII characters.
   In order to explain conveniently, some special ASCII characters or character strings are expressed as following: ↵ = CR/LF， “ENTER” First and New line later character. ← = CR，“ENTER” character only. · = Space，Space character [ESC] = ESC， Code-change character [X] = Character 0 to 9. [X3] = Input channel number（range form 0 to 8， 0 means to shut off the channel）

2. ASCII Character Table

Char.	ASCII Val		Char.	ASCII Val		Char.	ASCII Val		Char.	ASCII Val		Char.	ASCII Val	
	DEC	HEX		DEC	HEX		DEC	HEX		DEC	HEX		DEC	HEX
Esc	27	1B	1	49	31	E	69	45	Y	89	59	m	109	6D
CR	13	0D	2	50	32	F	70	46	Z	90	5A	n	110	6E
LF	10	0A	3	51	33	G	71	47	[	91	5B	o	111	6F
Space	32	20	4	52	34	H	72	48	\	92	5C	p	112	70
!	33	21	5	53	35	I	73	49	]	93	5D	q	113	71
“	34	22	6	54	36	J	74	4A	^	94	5E	r	114	72
#	35	23	7	55	37	K	75	4B	_	95	5F	s	115	73
$	36	24	8	56	38	L	76	4C	`	96	60	t	116	74
%	37	25	9	57	39	M	77	4D	a	97	61	u	117	75
&	38	26	:	58	3A	N	78	4E	b	98	62	v	118	76
‘	39	27	;	59	3B	O	79	4F	c	99	63	w	119	77
(	40	28	<	60	3C	P	80	50	d	100	64	x	120	78
)	41	29	=	61	3D	Q	81	51	e	101	65	y	121	79
*	42	2A	>	62	3E	R	82	52	f	102	66	z	122	7A
+	43	2B	?	63	3F	S	83	53	g	103	67	{	123	7B
,	44	2C	@	64	40	T	84	54	h	104	68	|	124	7C
-	45	2D	A	65	41	U	85	55	i	105	69	}	125	7D
.	46	2E	B	66	42	V	86	56	j	106	6A	~	126	7E
/	47	2F	C	67	43	W	87	57	k	107	6B	Del	127	7F
0	48	30	D	68	44	X	88	58	l	108	6C			

3. Error Code

Error Code	Explanation
E01↲	Not valid input channel number (out of the input channel number range）
E05↲	No Communication Allowable
E10↲	Not valid command
E14↲	Not exist command
E22↲	Device is busy

4. Detailed Commands

Tie single input channel to single output channel

Function	Tie input channel to output channel
Format	[X3]*[X2] &
Response	OUT[X2]·IN[X3]·DVI↲

For example: Tie input channel 1 to output channel 3

Commands sent by PC: 1*3&
Response by the device: Out03·In01·DVI↲

Tie multiple input channels to multiple output channels

Function	Tie multiply input channels to multiply output channels
Format	[ESC] Q [X3]*[X2]! … [X3]*[X2]! ←
Response	Out·Multi·In·Multi·All↲

For example: Tie the output channels 4,5,7 to the input channels 3,3,6 respectively
Commands sent by PC: [ESC]Q3*4&3*5&6*7&←
Response by the device: Out·Multi·In·Multi·All↲

Tie all output channels to the appointed input

Function	Tie all output channels to the appointed input
Format	[X3] ! Or [X3]&
Response	Out·Multi·In·[X3]·All↲ or Out·Multi·In·[X3]·DVI↲

For example: Tie all output channels to the appointed input channel 5
Commands sent by PC: 5&
Response by the device: Out·Multi·In·05·DVI↲

Macro command

Function 1	Set Macro
Format	M[X5]·[X3]*[X2]·…[X3]*[X2]·E
Response	Sma[X5]↲

For example： Set Macro 6
Macro 6: tie the input channels 16,15,14,13,12,11,10 to the output channels 1,2,3,4,5,6,7 respectively
Commands sent by PC: M6·16*1·15*2·14*3·13*4·12*5·11*6·10*7·E
Response by the device: Sma06↲

Function 2	Load Macro
Format	M[X5]! Or M[X5]&
Response	Rma[X5]·All ↲ or Rma[X5]·DVI↲

For example：Load Macro 2
Commands sent by PC: M2!
Response by the device: Rma02·All↲

Function 3	View Macro
Format	V[X5]； or v[X5]；
Response	M[X5]·[X3]*[X2]·…[X3]*[X2]·E

For example：View Macro 5
Commands sent by PC: V5；
Response by the device: M05·01*01·02*02·03*03·04*04·05*05·06*06·E
Response means the output channels 1,2,3,4,5,6 ties to the input channels 1,2,3,4,5,6 respectively.
If the response is M15 E, it means the Macro is not existed.

View the Switch Status of Single Output Channel

Function	View the status of single output channel
Format	V[X2]& or v[X2]&
Response	Out[X2]·In[X3]·DVI↲

For example: View the switch status of the output channel 7
Commands sent by PC: V7&
Response by the device: Out07·In02·DVI↲
Explanation: The output channel 7 is tied to the input channel 2.

Get the Software Version

Function	Get the software version.
Format	Q or q
Response	Ver[X].[X]↲
Note：”[X].[X]” stands for software version。	

For example ： Get the software version.
Commands sent by PC: Q
Response by the device: Ver1.0↲
Explanation: The software version is 1.0.

Get the Voltage Value of the Control Boards

Function	Get the Voltage value of the control boards.
Format	[X4]*2S
Response	Xf·Xf·Xf·Xf·Vol↲

Xf stands for the temperature on different parts of the control board. The corresponding relation is as follows:
Voltage NO. Normal voltage. Voltage step
1 +2.5V 6.51mV
2 +2.5V 5.86mV
3 +5.0V 13.02mV
4 +12.0V 31.25Mv
The actual temperature=(Data n)× 4 × corresponding voltage step.
For example
If Xf value is 0x5F, then the actual temperature is 0x5F×4×6.51=2473.8mV， namely 2.47V.

For example ： Get the Voltage value of the control boards.
Commands sent by PC: 1*2S
Response by the device: 96·82·97·102·Vol↲
Explanation: the actual temperature of respective boards are 2.5V,1.9V,5.05V, 12.75V。

Get the Signal Mark of Input Channels

Function	Get the signal mark of input channels
Format	[X4]*03S
Response	Xf·Xf·…·Xf·Xf·Sig↲
If Xf is 0, it means no signal. If Xf is 1, it means there is signal	

For example ： Get the signal mark of input channels
Commands sent by PC: 1*3S
Response by the device: 00·00·01·00·00·01·01·00·00·00·00·00·00·00·00·00·Sig↲
Explanation: The input channels 3,6 and 7 have signals.

Get the Load Mark of Output Channels

Function	Get the load mark of output channels
Format	[X4]*04S
Response	Xf·Xf·…·Xf·Xf·Load↲
If Xf is 0, it means no load. If Xf is 1, it means there is load	

For example ： Get the load mark of output channels
Commands sent by PC: 1*4S
Response by the device: 00·01·01·01·00·00·00·00·Load↲
Explanation: The output channels 2,3 and 4 have loads.

Get Device Temperature

Function	Get device temperature
Format	[X4]*05S
Response	[X4]Tem[X31]↲
The actual temperature: [X31]-20	

For example ： Get device temperature
Commands sent by PC: 1*5S
Response by the device: 1Tem51↲
Explanation: The actual temperature is 31.

Get the EDID of Outputs to Inputs

Function	Copy the EDID of the output channel to the input channel
Format	[X1]*[X2]~
Response	[X1]*[X2]·EDID↲

For example ： Copy the EDID of the output channel 3 to the input channel 4
Commands sent by PC: 4*3~
Response by the device: 4*3·EDID↲

Copy the Default EDID to Inputs

Function	Copy the default EDID to the input channel
Format	[X1]*15S
Response	Default↲

For example: Copy the default EDID to the input channel 4
Commands sent by PC: 4*15S
Response by the device: Default↲

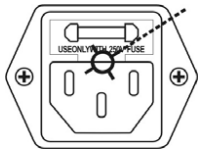
Reset Command

Function	Reset
Format	[ESC]zXXX
Response	ZapXXX↲

Section 4: Maintenance

4.1 Replace the Fuse

There is a spare fuse hidden in the power socket. Pull out the power cord and open the place showed on the picture, then pull out the fuse socket and put in a new fuse.



For safety consideration, please cut off the power supply before replacing the new fusee.

4.2 General Troubleshooting

Problem	Reason	Possible Solution
Power LED is not ON	• No power connected • Fuse is melted down • Power cord is short circuit	• Ensure that power cable is connected • Replace the fuse
No Signal Input and IN LED is ON	• The cable of Input is short circuit or completely off • The prior equipment doesn't Output signals • The prior equipment is PC which has never been disconnected	• Check or change the cable of Input • Ensure that equipments have signal by operating them • Change the PC's resolution
No Signal Output and IN LED is ON	• The cable of output is not connected • The device is not outputting signal	• Check the cable of output • Ensure that device is outputting the signal
There is a signal output with wrong colors and EDID LED is blinking	• The resolution from the source is not supported by the Matrix Switch	• Set the supported resolution on source device (PC etc) and then restart the source device
When setting high resolution, either there is no signal or output signal is not correct	• DVI cable is not of good quality • DVI cable is over 5 meters	• Use high performance DVI cable • Ensure that cable length between the source and DVI Matrix switch is less than 5 meters

Section 5: Specifications

	Description
Input Connector	DVI-D x 16
Output Connector	DVI-D x16
Network Connector	RJ45
RS232 Connector	DB9 Male
Input Resolution	1600x1200x60Hz
Supported Input Signal	DVI 1.0
Supported Output Signal	Same as Input Standard
Pixel Clock Frequency	24MHz – 165MHz
Control Options	RS232 or TCP/IP – 10M
Power Supply	AC 180V ~ 250V 50Hz
Max Output Current of Each Channel	100mA
Power Consumption	< 40W
Dimension (mm)	483x133x305 (3U Rack)
Weight	6Kg

205 Westwood Ave, Long Branch, NJ 07740
Phone: 866-94 BOARDS (26273) / (732)-222-1511
Fax: (732)-222-7088 | E-mail: sales@touchboards.com

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